

# E85 Fuel Infrastructure Presentation

Massachusetts Clean Cities

EPAct Fleet Workshop

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Gulf Oil

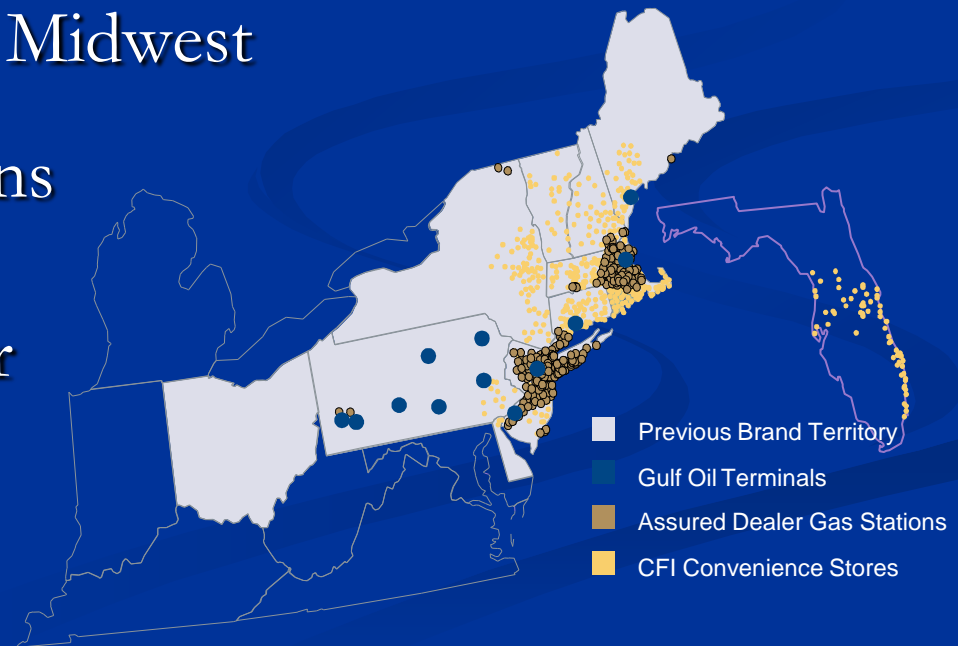
Laura Scott

[lscott@gulfoil.com](mailto:lscott@gulfoil.com)

# Gulf Company Profile



- In service since 1901; previously an integrated oil company
- Now distributes fuel to approximately 2,400 retail stations in the Northeast and Mid-Atlantic; expanding into the Southeast and Midwest
- Supplies 3 billion gallons of transportation fuels and heating oil per year



# FUEL Glossary

## ■ What is E85?

- E85 is a motor fuel made up substantially of ethanol mixed with a small percentage of gasoline (nominally 85% ethanol and 15% gasoline).
- E85 is different from regular gasoline. Only special cars can use it. These special cars are called “flexible fuel vehicles.” You cannot put E85 in a conventional vehicle.
- E85 has been promoted as a cleaner-burning, renewable, domestic, and environmentally friendly fuel that enhances the nation's economy and energy independence.

# Why XYZ as a Transportation Fuel

## Ethanol Positives

- Reduces greenhouse gas emissions\*
- Positive contributor to the US economy
- Improves energy security through reduced need for fossil fuel imports
- Downward price effect on oil by lowering demand

## Ethanol Negatives

- Increased use of water & fertilizer
- Conversion of protected land to crop use
- Contributing factor to higher food costs
- Marginal net btu yield with corn

## Advantages vs. Disadvantages

\* Provided coal isn't used to run the ethanol plants

# The Cost of Ethanol

Sometimes  
ethanol is  
more  
expensive per  
gallon than  
gasoline and  
sometimes it  
is cheaper

**PLATTS New York Harbor Ethanol & RBOB Prices**

average of daily low and high prices



# Ethanol's Efficiency as a Fuel

## EFFICIENCY LOSS BY BTU CONTENT

1 U.S. Gallon of gasoline contains 114,132 btu

1 U.S. Gallon of ethanol contains 76,000 btu

Ethanol is *denatured* by adding 2 gallons of gasoline to 100 gallons of ethanol (1.96%),

Ethanol @ 76,000 btu/gal x 98.04%	=	74,510
Gasoline @ 114,132 btu/gal x 1.96%	=	2,237
Denatured ethanol	=	76,747 btu/gallon

E85 is then a blend of denatured ethanol and gasoline, therefore:

Denatured ethanol @ 76,747 btu/gal x 80%	=	61,398
Gasoline @ 114,132 btu/gal x 20%	=	22,826
E85	=	84,224 btu/gallon

84,224 divided by 114,132	=	0.7380
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1 minus .7379553 = 26% efficiency loss	=	0.2620
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# Net E85 Cost

	Gasoline	E85
RBOB Price (Calendar 2011)	2.23	2.21
RBOB Percentage	90%	20%
<b>Gasoline Component</b>	<b>2.01</b>	<b>0.44</b>
 Pre-Tax Ethanol Price	 2.21	 2.21
Tax Credit	0.45	0.45
<b>Post Tax Credit Ethanol Price</b>	<b>1.76</b>	<b>1.76</b>
Ethanol Percentage	10%	80%
	<b>0.18</b>	<b>1.408</b>
<b>Gasoline Price Per Gallon</b>	<b>2.18</b>	<b>1.85</b>
 Gasoline Equivalent Price (26% efficiency loss)	 2.18	 2.50
Gasoline Equivalent Price (20% efficiency loss)	2.18	2.31

E85 is not actually E85 because the blend ratio is changed seasonally to adjust volatility to provide adequate cold start + warm up performance. Generally, in the summer, E85 is 85% denatured ethanol, in the winter it is 75% denatured ethanol, and in the spring and fall it is 80% denatured ethanol. On a year-round basis, we therefore assume 80%

# Retail Station E85 Costs

## Description of Work Estimated Cost

Tank - 1-4K DWFG	\$12,000
Ballast - Water	\$300
Piping - DWFG	\$1,500
Misc. Equipment	\$10,500
Dispenser	\$16,500
Monitoring Equipment	\$2,050
Fire Suppression - Minor Work	\$5,100
Signage	\$4,050
Permits	\$1,500
Engineering	\$2,350
Gas Construction	\$50,900
Shoring	\$9,000
Paving - Patch Only	\$4,800
Electrical	\$10,000
Sitework	\$13,500
Testing	\$1,000
Other	\$950

**TOTAL: \$146,000**

Fire Suppression -  
Replacement \$38,000

## E85 GALLONS NEEDED

Annual profit needed (based on 3 year 5% return)	\$53,612
Annual gallon sales needed (assuming \$.10 per gal margin)	536,125
Daily gallon sales needed	1,469
Avg daily FFV gallons (15,000 mi per yr, 20 mpg)	2
<b>Daily FFVs needed</b>	<b>734</b>

- US contains 3.5 million square miles
- 8 million FFVs
- 2.3 FFVs per square mile
- 23 FFVs over 10 square miles

# E85's Market Penetration



## The Chicken... or

US total vehicle count = 244 million

Flex Fuel Vehicle Count = 8 million

**Only 1 in 30 cars is a flex fuel vehicle**

## The Egg?

US total gas station count = 159,000

Stations selling E85 = 2,400

**Only 1 in 66 stations carries E85**

# Thank You

Laura Scott

Gulf Oil Limited Partnership

100 Crossing Boulevard

Framingham, MA 01702

(508) 270-8300

lscott@gulfoil.com